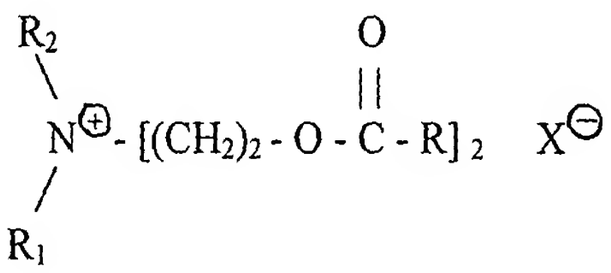
CLAIMS

WHAT IS CLAIMED AS NEW AND USEFUL AND DESIRED TO BE SECURED BY LETTERS PATENT IS:

1. A process for beneficiating a siliceous mineral ore by froth flotation, comprising treating the siliceous mineral ore with an effective amount of a quaternary esteramine represented by the formula:



wherein

R is C_{12}-C_{22} alkyl or alkenyl, or mixtures thereof;

R_1 is C_1-C_4 alkyl or hydroxyethyl;

R_2 is methyl or ethyl substituent; and

$X^{\ominus}$ is a cationic compatible anion.

2. A process according to claim 1 wherein the mineral ore is a phosphate ore.

3. The process according to claim 1 wherein the quaternary esteramine is derived from tall oil fatty acid, tallow, or vegetable fatty acid, or derivatives thereof.

4. A process according to claim 1 wherein the quaternary esteramine is derived from triethanolamine condensates.

5. A process according to claim 1 wherein the quaternary esteramine is derived from N-methyldiethanolamine or N-methyldiethanolamine by-product condensates.

6. A process according to claim 1 wherein the quaternary esteramine is prepared using dimethyl sulfate, diethyl sulfate or methyl chloride.

7. A process according to claim 2 wherein the phosphate ore is a rougher concentrate and the collector is present in a ratio of from about 0.05 to about 1 kilogram of collector per metric ton of rougher float concentrate.

8. A process according to claim 1 wherein the quaternary esteramine is selected from the group consisting of methyl bis[ethyl (tallate)] -2- hydroxyethyl ammonium methyl sulfate; methyl bis[ethyl (tallowate)] -2- hydroxyethyl ammonium methyl sulfate; dimethyl bis[ethyl (tallate)] ammonium methyl sulfate; dimethyl bis[ethyl (tallowate)] ammonium methyl sulfate; methyl bis[ethyl (soyate)] -2- hydroxyethyl ammonium methyl sulfate; and dimethyl bis[ethyl (soyate)] ammonium methyl sulfate.